

# New Distributional Records of Eastern Kentucky Fishes

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**ABSTRACT.**— A two year survey of the major river drainages of eastern Kentucky resulted in new records and range extensions of several rare or poorly known fish species. *Ichthyomyzon fossor* is reported for the first time in the Little Sandy River and South Fork of the Kentucky River, and *Notropis galacturus* from the Big Sandy, Laurel and upper Cumberland (above the falls) rivers. The range of *Phoxinus cumberlandensis* is extended to include Laurel and Rockcastle rivers. *Etheostoma tippecanoe* is noted for the first time in the Cumberland River within Kentucky, and the most upstream record of *Percina phoxocephala* in the Ohio River valley of the state is reported. Additional localities and range extensions are noted for eight rare or poorly known Kentucky fishes. Notes on distribution, habitat, and associates are included.

## INTRODUCTION

During 1978 and 1979, the Kentucky Nature Preserves Commission conducted aquatic biota surveys of selected streams in four major river drainages of eastern Kentucky (Harker et al. 1979, 1980). Considering past and projected growth of the coal mining industry in this region and the concomitant impacts on stream ichthyofauna, it is apparent that documentation of the existing fauna is both necessary and timely. Much of the distributional information concerning this region is from scattered collections without proper documentation (e.g., locality data, voucher material). The stream fishes of the Big Sandy, Licking, and upper Cumberland rivers are particularly poorly known in terms of substantiated collections (Burr 1980). Collecting efforts of the Kentucky Nature Preserves Commission resulted in distributional information for several poorly known or rare species in the state and suggest that our knowledge of the eastern Kentucky ichthyofauna is far from complete.

Several of the records reported are included in both Burr (1980) and Lee et al. (1980), although not in the detail covered here. The following accounts of species are presented for the purpose of enriching and elucidating knowledge of the varied Kentucky ichthyofauna.

## SPECIES ACCOUNTS

The following accounts extend the range of several fish species within and across drainages of eastern Kentucky. The majority of reported specimens were collected during field work conducted by the Kentucky Nature Preserves Commission, although several records were taken from collections examined by the author at the Kentucky

Department of Fish and Wildlife Resources (KFW). A detailed account of methodology and a discussion of most collecting stations, including macrobenthic, periphyton, substrate, and water quality analyses, was presented in Harker et al. (1979, 1980). The bulk of the collections are housed at the Kentucky Nature Preserves Commission (KNP). Other material as noted is deposited at Auburn University (AU), Eastern Kentucky University (EKU), Tulane University (TU), University of New Orleans (UNO), University of Tennessee (UT), and in the collection of Wayne C. Starnes (WCS).

Species accounts include the catalog numbers, followed in parentheses by the number of specimens, the stream and major drainage, the locality, county, and date of collection. All scientific and common names follow Robins et al. (1980), except in the case of undescribed taxa.

*Ichthyomyzon fossor* Reighard and Cummins. Northern brook lamprey. KNP SO1CAR (2), UT 2.81 (2), WCS 1010-01 (2), Big Sinking Cr. (Little Sandy R. dr.), 1.7 km above mouth, Carter Co., 31 May 1978; KNP K01CLA (1), Goose Cr. (S. Fk. Kentucky R. dr.), at Lipps, Clay Co., 9 May 1978.

Bauer and Branson (1979) recently reported this nonparasitic lamprey from the Middle Fork of the Kentucky River. Previously it was reported from the upper Big Sandy and Barren rivers (Clay 1975), but Burr (1980) did not recognize the latter record. The present collections constitute a new record for the Little Sandy River and an extension of the known distribution in the Kentucky River to the South Fork. All specimens were adults and were taken from areas of swift current over substrates of rubble interspersed with sand and gravel. Both the Ozarkian and Ohio Valley populations of *I. fossor* are relatively isolated from the widely distributed orthern populations (Pflieger 1971; Rohde and Lanteigne-Courchene 1980). The Kentucky distribution of *I. fossor* strongly suggests that former tributaries of the ancient Teays River (e.g., Big Sandy, Little Sandy and Kentucky rivers) (Hocutt et al. 1978) served as refugia and redispersal points during and after Pleistocene glaciation. Although its rarity in Kentucky is partly attributable to the difficulty of collecting adults in preferred habitats (Bauer and Branson 1979), the Kentucky Academy of Science considers the species to be threatened (Branson et al. 1981).

*Notropis galacturus* (Cope). Whitetail shiner. UT 44.1757 (3), Russell Fk. (Big Sandy R. dr.), below Chesapeake and Ohio Railroad bridge at KY 80, Pike Co., 23 May 1978; KFW 1526 (38), Russell Fk. (Big Sandy R. dr.), at mouth of Grassy Br., Pike Co., 30 August 1961; KNP BO1PIK (70), Elkhorn Cr. (Russell Fk. Big Sandy R. dr.), 3.3 km W of jct KY 80 and KY 197, Pike Co., 11 October 1978; KFW 1521 (7), same locality, 29 August 1961; KFW 1643 (37), Clover Fk. (Cumberland R. dr.), KY 38 bridge, Harlan Co., 27 September 1961; KFW 1508 (4), Laurel R. (Cumberland R.

dr.), at mouth of Spruce Cr., Whitley Co., 23 August 1961; KNP CO7LAU (13), Laurel R. (Cumberland R. dr.), 3.1 km above the mouth of Adams Br., Laurel Co., 11 October 1979.

In Kentucky this distinctive cyprinid is relatively common in clear streams in the Cumberland River below Cumberland Falls. Although noted by Clay (1975) from the Big Sandy River and upper Cumberland River (above the falls), locality data were not given. Gilbert and Burgess (1980a) did not include the Big Sandy, upper Cumberland, or Laurel rivers in their depiction of the Kentucky range. The collections noted here are apparently the only formally published localities of the whitetail shiner in these drainages. It is also known from the upper Tennessee and New rivers of Virginia (Gibbs 1961), which closely abut the headwaters of the Big Sandy and Cumberland rivers. The presence of the species in the four adjacent drainages suggests stream capture as the means of dispersal, and Gibbs (1961) interpreted the presence of *N. galacturus* in the New River as the result of piracies between the New and upper Tennessee rivers. Subsequent workers regarded the New River populations as probably native (Jenkins et al. 1971) or introduced (Gilbert and Burgess 1980a). Limited distribution such as that observed in the New and Big Sandy rivers may be the result of first entry during recent times, reentry after extirpation, or introduction rather than natural factors (Jenkins et al. 1971). In light of the apparent absence of other species indicative of stream capture with adjacent drainages, populations of *N. galacturus* in the Big Sandy River are most likely the result of introduction.

The only historical reference to *N. galacturus* in the Cumberland River above the falls was by Evermann (1918), who apparently erroneously cited Woolman's (1892) Rockcastle River locality. The rarity of *N. galacturus* in surveys above the falls may be in part related to the extensive habitat destruction associated with coal mining. Its apparent rarity in the Laurel River is attributable to habitat destruction and the lack of systematic surveys before the impoundment of Laurel River Reservoir. Interpretation of the native or non-native status above Cumberland Falls invokes reasoning similar to the interpretation of the populations in the New and Big Sandy rivers, although there is strong faunal evidence of lateral stream transfer between the Cumberland and upper Tennessee (Clinch-Powell) rivers (Starnes et al. 1977). Additional collections, comparison, and analyses of populations in the Big Sandy, Cumberland, New, and Tennessee rivers may further enlighten the enigmatic dispersal history and distribution of *N. galacturus*.

*Notropis* sp. Undescribed. Sawfin shiner. AU 18680 (4), KNP CO1MCY (13), EKU uncat. (4), Rock Cr. (Big S. Fk. Cumberland R. dr.), 6.7 km SW of Bell Farm at Great Meadows Camp Site, McCreary Co., 19 September 1978; AU uncat. (1), KNP uncat. (4), Pitman Cr. (Cumberland R. dr.), Co. Rd. 1247 bridge in Somerset, Pulaski Co., 25 October 1979.

This undescribed relative of the mirror shiner, *Notropis spectrunculus*, was previously known in Kentucky from a single record in the Little South Fork of the Cumberland River (Comiskey and Etnier 1972; John S. Ramsey, pers. comm.). The two additional localities noted above indicate a wider but sporadic distribution in the Big South Fork and middle Cumberland rivers of eastern Kentucky. The rarity of the sawfin shiner in Kentucky may be related in part to lack of recognition by early workers and to the embayment of tributaries by Cumberland River Reservoir. Additional Kentucky collections are anticipated in other medium-to-large streams of the drainage. The species is considered threatened in Kentucky by the Kentucky Academy of Science (Branson et al. 1981).

*Phoxinus cumberlandensis* Starnes and Starnes. Blackside dace. WCS 883-01 (1), Marsh Cr. (Cumberland R. dr.), 1.8 km S of Co. Rd. 1470 on Marsh Cr. Rd., McCreary Co., 4 May 1978; KNP CO2MCY (3), same locality, 19 September 1978; WCS 1163-01 (1), Craig Cr. (Laurel R. dr.), at KY 312 bridge, Laurel Co., 9 October 1979; KNP CO2LAU (2), Ned Branch (Rockcastle R. dr.), 0.6 km N of terminus of Co. Rd. 1193 and 50 m above the impounded mouth, Laurel Co., 25 July 1979; KNP CO1LET (1), Colliers Branch (Poor Fk. Cumberland R. dr.), 4.2 km E of jct US 119 and Colliers Br. Rd., Letcher Co., 22 April 1980; KNP uncat. (2), Poor Fk. (Cumberland R. dr.), 5.5 km ENE of jct US 119 and KY 932, Letcher Co., 1 June 1979; KNP CO2WHI (15), Bunches Cr. (Cumberland R. dr.), 1.5 km above the mouth, Whitley Co., 22 August 1979.

Previously, *P. cumberlandensis* was known in Kentucky from 12 extant and 2 apparently extirpated populations (Starnes and Starnes 1978). The addition of the six localities reported above indicates the species occurs from the extreme headwaters of the Poor Fork of the Cumberland River downstream to and including the Laurel River, lower Rockcastle River, and Beaver Creek systems. The species was collected in pool areas of headwater streams in association with undercut banks and/or rubble, boulder, and sand substrates. Most seine hauls yielded only one or two individuals. The general habitat description presented by Starnes and Starnes (1978) agrees well with my observations.

*Phoxinus cumberlandensis* apparently evolved in isolation in the Cumberland River drainage above Cumberland Falls, which represents the major part of the known range (Starnes and Starnes 1978). The discovery of populations in the Laurel and lower Rockcastle rivers below Cumberland Falls represents the first records for these drainages and raises questions concerning the circumvention of the falls. In order to explain the presence of *P. cumberlandensis* immediately below Cumberland Falls, Starnes and Starnes (1978) postulated lateral stream capture or the relatively rapid regression of the falls in recent geologic time.

McGrain (1966) placed the downstream origin of the falls near the present location of Burnside, Kentucky, which is well downstream of the present mouths of both the Laurel and Rockcastle rivers. The presence of *P. cumberlandensis* in these river systems suggests the relatively rapid regression of Cumberland Falls as the most likely explanation for the present distribution. Further faunal evidence is implied by the Cumberland River distribution of *Etheostoma kennicotti* as presented by Page and Smith (1976). Unfortunately, the dispersal and distribution of *P. cumberlandensis* is obscured and fragmented by man's activities in the area (i.e., mining, impoundments, etc.). In addition, there is apparently no geological record of the regression of Cumberland Falls (McGrain 1966). The blackside dace is listed as threatened by the Kentucky Academy of Science (Branson et al. 1981).

*Percopsis omiscomaycus* (Walbaum). Trout-perch. KNP BO1LAW (3), Little Blaine Cr. (Big Sandy R. dr.), 3.5 km NW of the jct KY 32 and Little Blaine Cr. Rd., Lawrence Co., 3 October 1978; UT 79.4 (4), KNP SO1CAR (2), Big Sinking Cr. (Little Sandy R. dr.), 1.7 km above mouth, Carter Co., 13 September 1978.

Although primarily a northern species, the trout-perch is widely but discontinuously distributed in Kentucky, with most records from the extreme northeastern section of the state (Clay 1975; Burr 1980). The Little Blaine Creek collections were believed to represent the most upstream locality in the Big Sandy River; however, material recently examined from Right Fork Beaver Creek (Levisa Fork Big Sandy R. dr.) indicates a much wider distribution in the Big Sandy than was previously known. The specimens are housed at the Kentucky Department of Transportation, Frankfort, Kentucky (Steve P. Rice, pers. comm.). Additional records in the middle and upper reaches of the Big Sandy River may be expected. *Percopsis omiscomaycus* is listed as of special concern in Kentucky by the Kentucky Academy of Science (Branson et al. 1981).

*Ammocrypta pellucida* (Putnam). Eastern sand darter. KNP uncat. (1), N. Fk. Red R. (Kentucky R. dr.), below KY 715 bridge at Menifee-Wolfe county line, 17 June 1978; KFW 1745 (4), Greasy Cr. (Middle Fk. Ky. R. dr.), no locality, Leslie Co., 15 August 1962; KFW 1160 (1), Middle Fk. (Kentucky R. dr.), no locality, Leslie Co., 15 June 1960.

*Ammocrypta pellucida* is known from few localities in the Kentucky River drainage (Williams 1975; Hocutt 1980). The species was previously reported from localities in the lower reaches of the Red River (Branson and Batch 1974) and in the North and South Forks of the Kentucky River (Williams 1975). The above collection extends the known range in the Red River approximately 33 km upstream and indicates a broader distribution in this system than was previously reported. The specimens from Middle Fork of the Kentucky River constitute a new record for this drainage and indicate that *A. pellucida* occurred throughout the upper Kentucky River. The Red River specimen was taken at the margin of a deep (1.0 m), gently

flowing pool underlain by clean sand. Repeated efforts to secure additional specimens were unsuccessful. The specimen was taken with *Etheostoma nigrum*, another psammophilic species. Burr (1980) observed that the once relatively common eastern sand darter is rapidly declining in numbers in Kentucky. The Kentucky Academy of Science lists the species as threatened (Branson et al. 1981).

*Etheostoma cinereum* Storer. Ashy darter. KNP CO5ROC (2), Rockcastle R. (Cumberland R. dr.), at mouth of Eagle Cr., Rockcastle Co., 23 October 1979; KNP CO9MCY (1), Big S. Fk. (Cumberland R. dr.), 3.0 km N of Tennessee state line at mouth of Troublesome Cr., McCreary Co., 24 October 1979.

The ashy darter is confined to the Cumberland River in Kentucky and is known from six substantiated collections, including those shown above (Burr 1980 and pers. comm.). Although Saylor (1980) and Branson (1977) noted the species in the Rockcastle River, no exact localities were given. The above collection is considered the first formal report of the species from this river. Subsequent collections in upstream segments of the Rockcastle River have yielded a number of additional specimens (Brooks M. Burr, pers. comm.). At both sites, *E. cinereum* was collected in sluggish current adjacent to swift shoals over rubble-gravel substrate mixed with detritus and/or dead *Justicia americana* in areas 0.45-0.75 m deep. No fishes were associated with *E. cinereum* on the substrate; however, *Notropis ariomus*, *N. chrysocephalus*, and *N. rubellus* occurred in the water column directly above.

*Etheostoma nigrum susanae* (Jordan and Swain). Johnny darter. KNP CO5MCY (2), Bridge Fk. Laurel Cr. (Cumberland R. dr.), directly above mouth on KY 478, McCreary Co., 12 September 1979; KNP CO2WHI (5), Bunches Cr. (Cumberland R. dr.), 1.5 km above mouth, Whitley Co., 22 August 1979.

In a recent taxonomic evaluation of this rare subspecies, Starnes and Starnes (1979) reported extant populations above Cumberland Falls within Whitley and McCreary counties. The collections reported above represent new localities from the same general area. Both collections were made in small streams with well-forested watersheds and excellent water quality. Individuals were generally collected over clean-swept sand and bedrock at the base of gentle riffles or in shallow pools. *Etheostoma nigrum susanae* is the only endemic fish above Cumberland Falls and is currently listed by the Kentucky Academy of Science as threatened (Branson et al. 1981).

*Etheostoma tippecanoe* Jordan and Evermann. Tippecanoe darter. KNP uncat. (1), Big S. Fk. (Cumberland R. dr.), 3.2 km N of Tennessee state line at mouth of Oilwell Br., McCreary Co., 24 October 1979.

In Kentucky, the Tippecanoe darter was formerly known from localized populations in the Licking, Green, and Kentucky rivers (Burr 1980; Clay 1975; Hocutt 1980). Although known from the Big South Fork of the

Cumberland River in Tennessee (Comiskey and Etnier 1972), this record, included in Burr (1980), is the first reported occurrence in the Cumberland River of Kentucky. One adult female was collected in a large, swift, rubble-gravel shoal approximately 0.3-0.5 m deep. Other members of the subgenus *Nothonotus* associated with *E. tippecanoe* were *E. maculatum sanguifluum* and *E. camurum*. The collection of one individual precludes evaluation of the status of the species in this segment of the river; however, *E. tippecanoe* is listed by the Kentucky Academy of Science as endangered (Branson et al. 1981).

*Percina copelandi* (Jordan). Channel darter. TU 120014 (3), Buckhorn Cr. (N. Fk. Kentucky R. dr.), 0.7 km NE of KY 476, Breathitt Co., 19 June 1978; KNP C09MCY (4), Big S. Fk. (Cumberland R. dr.), 3.0 km N of Tennessee state line at mouth of Troublesome Cr., McCreary Co., 29 August 1979; UT 91.1790 (22), WCS 1009-02 (5), KNP uncat. (6), Russell Fk. (Big Sandy R. dr.), below Chesapeake and Ohio Railroad bridge at KY 80, Pike Co., 23 May 1978.

Burr (1980) regarded the channel darter as uncommon in Kentucky. The presence of the species in Buckhorn Creek represents the first formal record from the North Fork of the Kentucky River. Its occurrence in this relatively small system is surprising in light of its reported preference for big river habitats (Gilbert and Burgess 1980b). The population in the Big South Fork of the Cumberland River apparently represents the second reported locality from this system in Kentucky, although others have noted it from the same drainage in Tennessee (Comiskey and Etnier 1972; Page 1974; Gilbert and Burgess 1980b). An examination of the University of Louisville and KFW museum records revealed that all the collections reported by Clay (1975) from the Russell and Levisa Forks of the Big Sandy River pre-date 1960. The channel darter is apparently persisting in good numbers in Russell Fork as indicated by the present collections. Habitat and species associates are presented under the *Percina oxyrhyncha* account. The channel darter is considered of special concern in Kentucky by the Kentucky Academy of Science (Branson et al. 1981).

*Percina oxyrhyncha* (Hubbs and Raney). Sharpnose darter. KNP B01JOH (5), Levisa Fk. (Big Sandy R. dr.), 1 km N of River, Johnson Co., 2 October 1978; WCS 1009-03 (4), UT 91.1789 (7), Russell Fk. (Big Sandy R. dr.), below Chesapeake and Ohio Railroad bridge at KY 80, Pike Co., 23 May 1978; KFW 1533 (49), Russell Fk. (Big Sandy R. dr.), mouth of Grassy Br. at Kentucky-Virginia line, Pike Co., 30 August 1961; KFW 1225 (5), Levisa Fk. (Big Sandy R. dr.), mouth of Morgans Cr., Pike Co., 27 September 1960; KFW 1803 (34), N. Fk. (Kentucky R. dr.), Rocklick, Breathitt Co., 19 September 1972.

The darter subgenus *Swainia* is represented in Kentucky by three morphologically similar species, *P. oxyrhyncha*, *P. squamata*, and *P. phoxocephala* (see following accounts). Because of morphological similarities, much confusion has resulted concerning assignment to species within

the subgenus. *Percina oxyrhyncha* was unknown in Kentucky until Denoncourt et al. (1977) reported specimens from the upper Kentucky River, and others later noted the species from the upper Big Sandy, Licking, and Green rivers (Thompson 1978; Bauer and Branson 1979; Burr 1980; Thompson 1980a). Thompson (1980a) depicted the range in the Big Sandy River as the extreme headwaters of Levisa and Russell Forks near the Kentucky-Virginia line. The collections of my report indicate that the species is common in Russell Fork, and that the range extends downstream in Levisa Fork at least 80 km from the Kentucky-Virginia line.

The Levisa Fork specimens were adults and were taken in a swift, boulder strewn shoal (0.8-1.0 m deep) directly adjacent to a dense bed of *Justicia americana*. The only directly associated percid was *Percina sciera*. In contrast, the series of juveniles from Russell Fork was collected from a shallow (0.15 m), rubble-gravel shoreline area with moderate current. Species associates included juvenile *Percina evides*, *P. copelandi*, *P. sciera*, and *P. caprodes*. Denoncourt et al. (1977) noted a correlation of specimen size with both substrate and gradient; the above observations support their findings. The rarity of *P. oxyrhyncha* in Kentucky is no doubt partly attributable to taxonomic confusion and the difficulty of collecting adults in the preferred big river habitats. The status of the species is currently listed as undetermined by the Kentucky Academy of Science (Branson et al. 1981).

*Percina phoxocephala* (Nelson). Slenderhead darter. UNO 3346 (1), Tygarts Cr. (Ohio R. dr.), Bennetts Covered Bridge at jct KY 7 and Co. Rd. 1215, Greenup Co., 31 May 1978.

*Percina phoxocephala* is most easily confused with *P. oxyrhyncha*. It differs in having lower meristics, a more robust body, and less elongate head and snout (Bruce A. Thompson, pers. comm). Hubbs and Raney (1939) regarded the snout length as diagnostic in separating the two species. The slenderhead darter is the most widely distributed member of the subgenus *Swainia* and has been previously reported in Kentucky from the Green, lower Kentucky (Eagle Creek), Tennessee and Cumberland rivers (Burr 1980; Thompson 1980b). The specimen from Tygarts Creek represents the most upstream record in the Ohio River valley of Kentucky. Its presence in this stream is not unexpected in light of the proximity to populations in northern tributaries of the Ohio River (e.g., Scioto River).

The single adult male was near breeding condition, supporting the April to early June spawning period postulated by Thompson (1980b). The specimen was taken in a moderately fast sand and gravel riffle that supported a dense growth of *Justicia americana*. Personal observations in this and Green River collections suggest that adult *P. phoxocephala* occur



most often over gravel and/or finer substrates, whereas adult *P. oxyrhyncha* prefer coarser material such as rubble and boulders. Page and Smith (1971) and Denoncourt et al. (1977) made similar observations on substrate preferences of *P. phoxocephala* and *P. oxyrhyncha*, respectively. Acquisition of additional material may change current views of the complex distributional patterns of both *P. phoxocephala* and *P. oxyrhyncha* (Bruce A. Thompson, pers. comm.). Previous comments concerning the status of the sharpnose darter in Kentucky are also applicable to the slenderhead darter. The Kentucky Academy of Science presently lists *P. phoxocephala* as of special concern in Kentucky (Branson et al. 1981).

*Percina squamata* (Gilbert and Swain). Olive darter. KNP C04JAC (2), Middle Fk. (Rockcastle R. dr.), 4.5 km W of jct KY 89 and Co. Rd. 2002, Jackson Co., 23 August 1979.

According to Burr (1980), *P. squamata* is known in Kentucky only from the Rockcastle and Big South Fork Cumberland rivers. Although previously reported from the Rockcastle River (Bauer and Branson 1979; Thompson 1980c), the above collections represent the most upstream occurrence. The specimens were secured from below a swift, deep (0.8-1.0 m) riffle over a rubble and boulder substrate. Thompson (1978) stated that until recently the olive darter was the poorest known member of the subgenus *Swainia*, and one of the least known members of the genus *Percina*. The olive darter is listed by the Kentucky Academy of Science as endangered (Branson et al. 1981).

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## LITERATURE CITED

- Bauer, Bruce H., and B. A. Branson. 1979. Distributional records for and additions to the ichthyofauna of Kentucky. *Trans. Ky. Acad. Sci.* 40:53-55.
- Branson, Branley A. 1977. Threatened fishes of Daniel Boone National Forest, Kentucky. *Trans. Ky. Acad. Sci.* 38:69-73.
- \_\_\_\_\_, and D. L. Batch. 1974. Fishes of the Red River Drainage, Eastern Kentucky. Univ. Press Kentucky, Lexington. 67 pp.
- \_\_\_\_\_, D. F. Harker, Jr., J. M. Baskin, M. E. Medley, D. L. Batch, M. L. Warren, Jr., W. H. Davis, W. C. Houtcooper, B. M. Monroe, Jr., L. R. Phillippe and P. Cupp. 1981. Endangered, threatened, and rare animals and plants of Kentucky. *Trans. Ky. Acad. Sci.* 42:77-89.
- Burr, Brooks M. 1980. A distributional checklist of the fishes of Kentucky. *Brimleyana* 3:53-84.
- Clay, William M. 1975. The Fishes of Kentucky. Ky. Dep. Fish Wildl. Resour., Frankfort. 416 pp.
- Comiskey, Charles E., and D. A. Etnier. 1972. Fishes of the Big South Fork of the Cumberland River. *J. Tenn. Acad. Sci.* 47:140-145.
- Denoncourt, Robert F., C. H. Hocutt and J. R. Stauffer, Jr. 1977. Notes on the habitat, description and distribution of the sharpnose darter, *Percina oxyrhyncha*. *Copeia* 1977(1):168-171.
- Evermann, Barton W. 1918. The fishes of Kentucky and Tennessee: a distributional catalogue of the known species. *Bull. Bur. Fish.* 35:295-368.
- Gibbs, Robert H., Jr. 1961. Cyprinid fishes of the subgenus *Cyprinella* of *Notropis*. IV. The *Notropis galacturus-camurus* complex. *Am. Midl. Nat.* 66:337-354.
- Gilbert, Carter, R., and G. H. Burgess. 1980a. *Notropis galacturus* (Cope), Whitetail shiner. p. 266 in D. S. Lee, et al. Atlas of North American Freshwater Fishes. N. C. State Mus. Nat. Hist., Raleigh. x + 867 pp.
- \_\_\_\_\_, and \_\_\_\_\_. 1980b. *Percina copelandi* (Jordan), Channel darter. p. 721 in D. S. Lee, et al. Atlas of North American Freshwater Fishes. N. C. State Mus. Nat. Hist., Raleigh. x + 867 pp.
- Harker, Donald F., Jr., S. M. Call, M. L. Warren, Jr., K. E. Camburn and P. Wigley. 1979. Aquatic biota and water quality survey of the Appalachian Province, eastern Kentucky. Tech. Rep. Ky. Nature Preserves Comm., Frankfort. 1152 pp.
- \_\_\_\_\_, M. L. Warren, Jr., K. E. Camburn, S. M. Call, G. J. Fallo and P. Wigley. 1980. Aquatic biota and water quality survey of the upper Cumberland River basin. Tech. Rep. Ky. Nature Preserves Comm., Frankfort. 683 pp.
- Hocutt, Charles H., R. F. Denoncourt and J. R. Stauffer, Jr. 1978. Fishes of the Greenbrier River, West Virginia, with drainage history of the central Appalachians. *J. Biogeogr.* 1978(5):59-80.
- \_\_\_\_\_. 1980. *Etheostoma tippecanoe* Jordan and Evermann, Tippecanoe darter. p. 703 in D. S. Lee, et al. Atlas of North American Freshwater Fishes. N. C. State Mus. Nat. Hist., Raleigh. x + 867 pp.
- Hubbs, Carl L., and E. C. Raney. 1939. *Hadropterus oxyrhynchus*, a new percid fish from Virginia and West Virginia. *Occas. Pap. Mus. Zool. Univ. Mich.* 396:1-9.

- Jenkins, Robert E., E. A. Lachner and F. J. Schwartz. 1971. Fishes of the central Appalachian drainages: Their distribution and dispersal. pp. 43-117 in P. C. Holt (ed.). The distributional history of the biota of the southern Appalachians, Part III: Vertebrates. Res. Div. Monogr. 4, Va. Polytech. Inst. State Univ., Blacksburg. 306 pp.
- Lee, David S., C. R. Gilbert, C. H. Hocutt, R. E. Jenkins, D. E. McAllister and J. R. Stauffer, Jr. 1980 et seq. Atlas of North American Freshwater Fishes. N. C. State Mus. Nat. Hist., Raleigh. x + 867 pp.
- McGrain, Preston 1966. Geology of the Cumberland Falls State Park area. Ky. Geol. Surv. Series X, Spec. Publ. 11.
- Page, Lawrence M. 1974. The subgenera of *Percina* (Percidae: Etheostomatini). *Copeia* 1974(1):66-86.
- \_\_\_\_\_, and P. W. Smith. 1971. The life history of the slenderhead darter, *Percina phoxocephala*, in the Embarras River, Illinois. Ill. Nat. Hist. Surv. Biol. Notes 74. 14 pp.
- \_\_\_\_\_, and \_\_\_\_\_. 1976. Variation and systematics of the stripetail darter, *Etheostoma kennicotti*. *Copeia* 1976(3):532-541.
- Pfleiger, William L. 1971. A distributional study of Missouri fishes. Univ. Kan. Publ. Mus. Nat. Hist. 20:225-570.
- Robins, C. R., R. M. Bailey, C. E. Bond, J. R. Brooker, E. A. Lachner, R. N. Lea and W. B. Scott. 1980. A List of Common and Scientific Names of Fishes from the United States and Canada. 4th ed. Am. Fish. Soc. Spec. Publ. No. 12. 174 pp.
- Rohde, Fred C., and J. Lanteigne-Courchene. 1980. *Ichthyomyzon fossor* Reighard and Cummins, Northern brook lamprey. p. 17 in D. S. Lee, et al. Atlas of North American Freshwater Fishes. N.C. State Mus. Nat. Hist., Raleigh. x + 867 pp.
- Starnes, Wayne C., and L. B. Starnes. 1978. A new cyprinid of the genus *Phoxinus* endemic to the upper Cumberland River drainage. *Copeia* 1978(3):508-516.
- \_\_\_\_\_, and \_\_\_\_\_. 1979. Taxonomic status of the percid fish *Etheostoma nigrum susanae*. *Copeia* 1979(3):426-430.
- \_\_\_\_\_, D. A. Etnier, L. B. Starnes and N. H. Douglas. 1977. Zoogeographic implications of the rediscovery of the percid genus *Ammocrypta* in the Tennessee River drainage. *Copeia* 1977(4):783-786.
- Thompson, Bruce A. 1978. An analysis of three subgenera (*Hypohomus*, *Odontopholis* and *Swainia*) of the genus *Percina* (Tribe Etheostomatini, Family Percidae). Diss. Abstr. Int. B Sci. Eng. 38(9):4114B-4115B.
- \_\_\_\_\_. 1980a. *Percina oxyrhynca* (Hubbs and Raney), Sharpnose darter. p. 733 in D. S. Lee, et al. Atlas of North American Freshwater Fishes. N.C. State Mus. Nat. Hist., Raleigh. x + 867 pp.
- \_\_\_\_\_. 1980b. *Percina phoxocephala* (Nelson), Slenderhead darter. p. 737 in D. S. Lee, et al. Atlas of North American Freshwater Fishes. N.C. State Mus. Nat. Hist., Raleigh. x + 867 pp.
- \_\_\_\_\_. 1980c. *Percina squamata* (Gilbert and Swain), Olive darter. p. 742 in D. S. Lee, et al. Atlas of North American Freshwater Fishes. N.C. State Mus. Nat. Hist., Raleigh. x + 867 pp.

- Williams, James D. 1975. Systematics of the percid fishes of the subgenus *Ammocrypta*, genus *Ammocrypta* with descriptions of two new species. Bull. Alabama Mus. Nat. Hist. 1:1-56.
- Woolman, Albert J. 1892. Report of an examination of the rivers of Kentucky, with lists of the fishes obtained. Bull. U.S. Fish. Comm. 10:249-288.

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